### SN54F257, SN74F257 QUADRUPLE 2-LINE TO 1-LINE DATA SELECTORS/MULTIPLEXERS WITH 3-STATE OUTPUTS

SDFS065A - D2932, MARCH 1987 - REVISED OCTOBER 1993

- 3-State Outputs Interface Directly With System Bus
- Provides Bus Interface From Multiple Sources in High-Performance Systems
- Package Options Include Plastic Small-Outline Packages, Ceramic Chip Carriers, and Standard Plastic and Ceramic 300-mil DIPs

#### description

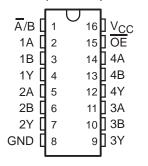
The 'F257 is designed to multiplex signals from 4-bit data sources to 4-output data lines in bus-organized systems. The 3-state outputs will not load the data lines when the output enable  $(\overline{OE})$  input is at a high logic level.

The SN54F257 is characterized for operation over the full military temperature range of  $-55^{\circ}$ C to 125°C. The SN74F257 is characterized for operation from 0°C to 70°C.

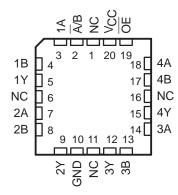
#### **FUNCTION TABLE**

	INPUTS					
ŌĒ	Ā/B	Α	В	Υ		
Н	Х	Χ	Х	Z		
L	L	L	X	L		
L	L	Н	X	Н		
L	Н	Χ	L	L		
L	Н	Χ	Н	Н		

#### SN54F257 . . . J PACKAGE SN74F257 . . . D OR N PACKAGE (TOP VIEW)

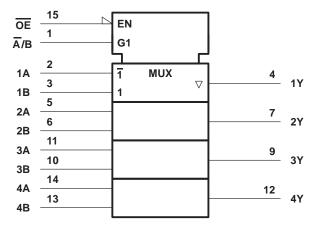


# SN54F257 . . . FK PACKAGE (TOP VIEW)



NC - No internal connection

### logic symbol†

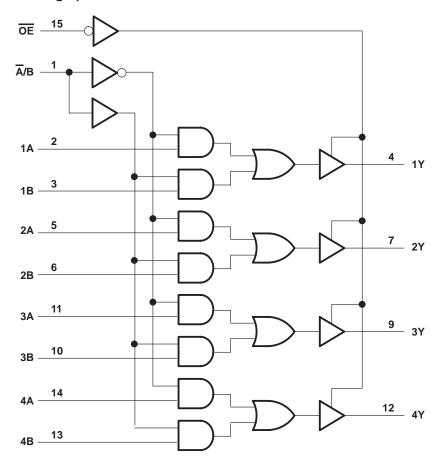


<sup>†</sup> This symbol is in accordance with ANSI/IEEE Std 91-1984 and IEC Publication 617-12. Pin numbers shown are for the D, J, and N packages.



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#### logic diagram (positive logic)



Pin numbers shown are for the D, J, and N packages.

### absolute maximum ratings over operating free-air temperature range (unless otherwise noted)†

Supply voltage range, V <sub>CC</sub>	
Input current range	
Voltage range applied to any output in the disabled or power-off state	
Voltage range applied to any output in the high state	–0.5 V to V <sub>CC</sub>
Current into any output in the low state: SN54F257	40 mA
SN74F257	48 mA
Operating free-air temperature range: SN54F257	–55°C to 125°C
SN74F257	0°C to 70°C
Storage temperature range	–65°C to 150°C

<sup>†</sup> Stresses beyond those listed under "absolute maximum ratings" may cause permanent damage to the device. These are stress ratings only and functional operation of the device at these or any other conditions beyond those indicated under "recommended operating conditions" is not implied. Exposure to absolute-maximum-rated conditions for extended periods may affect device reliability.

NOTE 1: The input voltage ratings may be exceeded provided the input current ratings are observed.



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### recommended operating conditions

		SN54F257		SN74F257				
		MIN	NOM	MAX	MIN	NOM	MAX	UNIT
VCC	Supply voltage	4.5	5	5.5	4.5	5	5.5	V
VIH	High-level input voltage	2			2			V
V <sub>IL</sub>	Low-level input voltage			8.0			8.0	V
liK	Input clamp current			-18			-18	mA
lOH	High-level output current			-3			-3	mA
loL	Low-level output current			20			24	mA
TA	Operating free-air temperature	-55		125	0		70	°C

#### electrical characteristics over recommended operating free-air temperature range (unless otherwise noted)

242445752	TEST CONDITIONS		SN54F257			SN74F257				
PARAMETER			MIN	TYP <sup>†</sup>	MAX	MIN	TYP <sup>†</sup>	MAX	UNIT	
VIK	V <sub>CC</sub> = 4.5 V,	I <sub>I</sub> = –18 mA			-1.2			-1.2	V	
	V <sub>CC</sub> = 4.5 V	$I_{OH} = -1 \text{ mA}$	2.5	3.4		2.5	3.4		V	
V <sub>OH</sub>		$I_{OH} = -3 \text{ mA}$	2.4	3.3		2.4	3.3			
	$V_{CC} = 4.75 V$ ,	$I_{OH} = -1 \text{ mA to } -3 \text{ mA}$				2.7				
.,	V <sub>OL</sub> V <sub>CC</sub> = 4.5 V	I <sub>OL</sub> = 20 mA		0.3	0.5				٧	
VOL		I <sub>OL</sub> = 24 mA					0.35	0.5		
lozh	$V_{CC} = 5.5 \text{ V},$	V <sub>O</sub> = 2.7 V			50			50	μΑ	
lozL	V <sub>CC</sub> = 5.5 V,	V <sub>O</sub> = 0.5 V			-50			-50	μΑ	
lı	V <sub>CC</sub> = 5.5 V,	V <sub>I</sub> = 7 V			0.1			0.1	mA	
lін	V <sub>CC</sub> = 5.5 V,	V <sub>I</sub> = 2.7 V			20			20	μΑ	
Ι <sub>Ι</sub> L	V <sub>CC</sub> = 5.5 V,	V <sub>I</sub> = 0.5 V			- 0.6			- 0.6	mA	
los <sup>‡</sup>	V <sub>CC</sub> = 5.5 V,	VO = 0	-60		-150	-60		-150	mA	
Іссн	V <sub>CC</sub> = 5.5 V, See Note 2	Condition A		9	15		9	15		
ICCL		Condition B		14.5	22		14.5	22	mA	
lccz	000110102	Condition C		15	23		15	23		

- A. A/B and all B inputs at 4.5 V, other inputs grounded
- B. All B inputs at 4.5 V, other inputs grounded
- C. OE and all B data inputs at 4.5 V, other inputs grounded

<sup>†</sup> All typical values are at V<sub>CC</sub> = 5 V, T<sub>A</sub> = 25°C. ‡ Not more than one output should be shorted at a time, and the duration of the short circuit should not exceed one second.

NOTE 2: ICC is measured with the outputs open under the following conditions:

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### switching characteristics (see Note 3)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	$V_{CC} = 5 \text{ V},$ $C_L = 50 \text{ pF},$ $R1 = 500 \Omega,$ $R2 = 500 \Omega,$ $T_A = 25^{\circ}C$			$V_{CC}$ = 4.5 V to 5.5 V, $C_L$ = 50 pF, $R1$ = 500 $\Omega$ , $R2$ = 500 $\Omega$ , $T_A$ = MIN to MAX $^\dagger$				UNIT
				′F257		SN54F257		SN74F257		
			MIN	TYP	MAX	MIN	MAX	MIN	MAX	
t <sub>PLH</sub>	A or B	A V	2.2	4.1	6	2.2	8	2.2	7	
<sup>t</sup> PHL		Any Y	1.2	3.8	5.5	1	8	1.2	6.5	ns
<sup>t</sup> PLH	Ā/B	Ā/D	3.7	9.7	13	3.7	15.5	3.7	15	
<sup>t</sup> PHL		Any Y	2.7	6.1	8.5	2.7	10.5	2.7	9.5	ns
<sup>t</sup> PZH	G	A V	2.2	5.5	7.5	2.2	9.5	2.2	8.5	
t <sub>PZL</sub>	G	G Any Y	2.2	5.1	7.5	2.2	10	2.2	8.5	ns
t <sub>PHZ</sub>	G Any Y	Anv	1.2	3.9	6	1.2	7	1.2	7	
tPLZ		1.2	4.1	6	1.2	9.5	1.2	7	ns	

<sup>†</sup> For conditions shown as MIN or MAX, use the appropriate value specified under recommended operating conditions. NOTE 3: Load circuits and waveforms are shown in Section 1.



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